Module title:	**Safety of food of animal origin 1**	**ECTS**	**4**
Polish translation:	**Bezpieczeństwo żywności pochodzenia zwierzęcego 1**		
Course:	**Veterinary Medicine**		

Module language: English		Stage: JM-FVM		
Form of studies: ■ intramural ☐ extramural	Type of module: ☐ basic ■ mandatory ■ directional ☐ elective	Semester: 8		☐ winter semester ■ summer semester
Academic year:		**Intake 2021/2022**	Catalogue number:	**FVM-V-JMSS-08S-D08_20**

Module coordinator:	**Dr hab. Agnieszka Jackowska-Tracz, prof. SGGW**
Teachers responsible for the module:	**Academic teachers of the Institute of Veterinary Medicine, Depertment of Food Hygiene and Public Health Protecion; PhD students in accordance to the internal legal acts; Other specialists if needed and possible**
Objectives of the module:	The aim of the education is to prepare students to work as official veterinarians, or private veterinarians cooperating with processing plants in the field of hygiene and safety of food of animal origin, i.e. fresh meat elements, cold meats, co-products and animal fats; as well as to work in all governmental and non-governmental organizations dealing with food safety. Students will learn about good practices in the production of food of animal origin; they will learn about hazards and critical points in the meat cutting plant as well as in the processing plant. They learn about food quality and safety assurance systems, food law regulations concerning processing of food of animal origin, principles of veterinary supervision, methods of examination and evaluation of raw materials and finished products of animal origin. Students learn the concepts of hazard analysis and risk assessment. Students will be able to carry out hazard analysis in the production of cold cuts and melted animal fats. Students will know and differentiate between the concepts of organoleptic assessment and sensory analysis of food. The student is able to assess the correctness of implementation and functioning of the food safety assurance system based on HACCP principles. **The content of laboratory classes (26 h):** - Breakdown of carcasses. Primal cuts for wholesale. Cutting and trimming - control points in the cutting plant (2 h). - Meat, slaughter co-products and animal by-products - analysis of food law requirements (2 h). - Fresh processed meat product, Cured meat cuts (raw and cooked), Raw-cooked meat product, Precooked-cooked meat products, Raw-fermented sausages; discussion of stage specific and non-stage specific hazards (4 h). - Hazard Analysis and Critical Control Points (HACCP) in processing plant: HACCP (1) – Prerequisite programs (PRPs); HACCP-plan preliminary activities; HACCP (2) - Hazard analysis; HACCP (3) Semi-quantitative risk evaluation procedure; determination of control points - oPRP, CCP (8 hours). - Sensory analysis - sensory acuity of students & sensory analysis of processed meat products (4 h). - Laboratory examination of sausages - organoleptic and microbiological examination. Microbiological examination of sausages - reading and analysis of results. Microbiological criteria for foodstuffs - work with the regulation (4 h). - Production of melted fat. Fat rancidity. Organoleptic and chemical examination of melted animal fats. Analysis of chemical test results (2 h) - if possible, a visit to the Analytical Centre of SGGW. **Seminars (13 h):** students analyse and present topics which complement or detail the topics of the laboratory exercises; students learn about available sources of knowledge in the field of food safety (EFSA reports and scientific opinions, applicable legislation, European Commission notifications, etc.). **Field exercises (6 h):** Professional trip; If possible, field classes will be organized in meat processing plants; the student learns the specifics of the official veterinarian's work, observes the procedures based on HACCP principles undertaken by the quality department and production staff; The content of the lectures supplements the content of the laboratory classes. **The content of the lectures (30 h):** PRPs and procedures based on HACCP principles. Facilitation/flexibility of the implementation of HACCP principles in certain food businesses. Zoonotic agents and food-borne outbreaks - food safety epidemiology. Non-bacterial microbiological hazards in food of animal origin. Endogenous postmortem changes in meat. Acidification of food of animal origin. Use of antagonistic microflora and chemical preservatives in food technology. Salting and curing of meat. Meat drying. Meat smoking. The theoretical basis for using high temperature in food preservation. Fundamentals of low-temperature food preservation.

Teaching forms, number of hours:	a) Lectures; hours 30; b) Laboratory classes; hours 26; c) Seminars; hours 13; d) Field exercises; hours 6; The implementation of field exercises is dependent on external stakeholders. In the situation when the realization of these exercises is not possible (e.g. lack of consent from food processing plants, District Veterinarian, in a situation of epidemics, etc.) the classes will be realized as laboratory or seminar exercises.
Teaching methods:	**LECTURES**: conducted using audio-visual means (authorial multimedia presentations, video). **SEMINARS**: multimedia presentations; in addition, students prepare 5 test questions covering the presented content, questions presented at the beginning and at the end of the seminar (analysis of answers in the forum) **Practical part**: Cutting and trimming; Meat, co-products and animal by-products - hazard analysis; analysis of EU law requirements (working in groups with the regulation). **HACCP system** - work in teams (2-3 people) chosen by the students: students entering the role of a food business operator (FBO) develop HACCP system documentation; design a product, develop a flow diagrams; using the risk assessment method carry out a hazard analysis; determine critical control points; learn to make team decisions; Then the teams exchange the documentation they have developed and entering the role of an official veterinarian carry out an audit of HACCP documentation; Presentation of conclusions on the forum, discussion. **Processing, laboratory tests of processed meats and fats** - students individually carry out organoleptic assessment and microbiological testing; working with the regulation, they establish process hygiene criteria and food safety criteria for the tested products; the teams analyze the obtained results of microbiological tests of processed meat; they calculate and interpret sample results of chemical tests of fats; they learn how to prepare a report from the test - presentation of conclusions on the forum, discussion. **Sensory analysis** - each student undergoes a test for sensory acuity (tests for taste daltonism, differentiation of smells and colours - Ishihara-type test), then students interpret their results; in groups, students carry out a sensory analysis of cold meats, recording the results in the work cards; analysis of the summary results, presentation of the results in the forum, discussion. **FIELD EXERCISES** - verification of flow diagrams; consultation, if possible, on keeping company HACCP records; observing the work of the quality department (monitoring of CCP/oPRP, keeping records); observation of the work of the official veterinarian and/or district veterinarian; observation of cooperation between the supervised FBO and official/district veterinarian; discussion. Consultation: 1h every other week. Detailed schedule will be defined by the coordinator of the course at the beginning of semester. Detailed organization of consultations will be defined by the coordinator of the course at the beginning of semester.
Formal prerequisites and initial requirements:	Medical certificate for sanitary and epidemiological purposes; Patomorphology 3

Learning effects		Course outcomes:	Learning outcomes relative to the course outcomes	Impact on the course outcomes*
Knowledge:	1	Student knows and understands how to document the results of official controls	B.W.7	3
	2	Student knows and understands the definitions of meat, co-products and animal by-products; knows the legal provisions referring to the above products	B.W.15, B.W.21	3
	3	Student knows the technological aspects of the production of cold cuts and fats, and knows the microbiological, physical and chemical hazards present in processed meat and fats; knows the legal provisions referring to the above products	B.W.17, B.W.21	3
	4	Student knows and understands the principles of implementation and maintenance of the prerequisite programmes and procedures based on HACCP principles	B.W.18	3
	5	Student knows and understands the principles of sensory acuity and sensory analysis, organoleptic assessment and microbiological testing of cold cuts; organoleptic assessment and chemical testing of fats; knows how to interpret the results of these tests	A.W.15 B.W.6	2 3
	6	Student knows the factors of the external and internal environment of food affecting the possibility of microbiological, chemical and physical hazards in food	B.W.20	3
	7	Student knows and understands the processes occurring in food as a result of the presence of microorganisms	B.W.20	3
	8	Student knows and understands food preservation methods; knows the advantages and disadvantages of using particular methods	B.W.20	3
	9	Student knows and understands the tasks of the official veterinarian in the cold meat and rendered animal fats processing plant	B.W.16, B.W.17, B.W.21 C.W.2 A.W.22, C.W.3	3 2 1

Skills:	1	Student is able to implement public health rules through the appropriate veterinary supervision of production of food of animal origin	A.U.16 A.U.19	1 3
	2	Student can prepare a protocol from an official control	C.U.4	3
	3	Student can assess the correct handling of animal by-products	A.U.19	3
	4	Student can identify the obligatory microbiological criteria (FSC, PHC) for different technological groups of cold cuts	B.U.18	3
	5	Student can formulate conclusions relating to process hygiene and/or food safety on the basis of studies performed	B.U.18	3
	6	Student can justify his/her decision by referring to food law	A.U.12	1
	7	Student can identify microbiological, physical and chemical hazards in processed meat and in the production environment; can assess risks; can verify the correct implementation and maintenance of prerequisites programmes and procedures based on HACCP principles	B.U.9 B.U.20 B.U.22	2 1 3
	8	Student can correctly source and synthesise information obtained on the processing, distribution and control of food production in order to effectively manage food safety, can make appropriate conclusions	A.U.21 C.U.2 C.U.3	1 3 2
	9	Student can plan and carry out sensory analysis of cold cuts, organoleptic assessment and microbiological examination of cold cuts; can prepare a report from this examination;	A.U.2, A.U.10, B.U.23 B.U.6	1 3
	10	Student can communicate with veterinarians and other persons involved in supervising cold meat and rendered fats production; can communicate with the supervised entity in a controlled and cultural manner;	A.U.13, A.U.15 A.U.23	3 2
Competences:	1	Student is prepared to work in an interdisciplinary team dealing with food safety	KS.3 KS.9, KS.11	2 3
	2	Student is prepared to communicate and cooperate with representatives of food processing plants in the field of food safety	KS.3	2
	3	Student is prepared to enhance her/his knowledge and to analyse it critically	KS.4 KS.8	3 2
	4	Student is prepared to do her/his job in an ethical and socially responsible manner	KS.2 KS.4 KS.10	3 2 1
	5	Student shows responsibility for decisions taken	KS.1	3
	6	Student is prepared to form independent conclusions and opinions	KS.5 KS.6, KS.12	3 1

Objectives of the module required to obtain learning effects:	Students will learn about good practices in the production of food of animal origin; they will learn about hazards and critical points in the meat cutting plant as well as in the processing plant. They learn about food quality and safety assurance systems, food law regulations concerning processing of food of animal origin, principles of veterinary supervision, methods of examination and evaluation of raw materials and finished products of animal origin. Students learn the concepts of hazard analysis and risk assessment. Students will be able to carry out hazard analysis in the production of cold cuts and melted animal fats. Students will know and differentiate between the concepts of organoleptic assessment and sensory analysis of food. The student is able to assess the correctness of implementation and functioning of the food safety assurance system based on HACCP principles.
Assessment methods:	Assessment of exercise reports, 3 written tests, seminars. In case of unforeseen, unusual circumstances mandatory remote teaching and remote assessment methods might be adopted.
Detail description of assessment methods; Formal documentation of learning outcome:	Practical effects of learning within the framework of laboratory classes are verified on the basis of the assessment of work cards (for credit) made by the teacher during the exercises. The student prepares documentation - a protocol from the performed activity together with the interpretation of obtained results. The assessment is made taking into account the criterion of form and content, with particular emphasis on the interpretation of the obtained results. A credit is the basis for obtaining a confirmation of the examination in the First Day Skills Diary. Learning outcomes including theoretical content are verified through: 1. **Colloquia (maximum 60 points in total):** 3 tests covering the theoretical content of three following parts of completed laboratories. Each test includes questions of a mixed nature (single-choice test questions and open questions). A maximum of 20 points can be awarded for one test. The student to pass must obtain at least 60% of the points from each test. The colloquium at the first and second term shall take the same form. 2. **Seminars (maximum 20 points):** the student is obliged to develop a selected topic from a pool of topics prepared by academic teachers; the student may obtain max. 20 pts., credit threshold 60% (12 pts.); Points are awarded by the teacher, who takes into account the transparency of the form of presentation, the accuracy of the selection of additional source materials, the accuracy of the selection of 5 test questions presented at the beginning and end of the seminar, answers to the questions of the group and the lecturers, formulating and defending opinions, interaction with the group. The points obtained for the colloquium and seminar are added together and form the basis for the final grade, according to the grading scale: % GRADE 92-100 very good 5.0 84-91 good+ 4.5

	76-83 good 4.0 68-75 sufficient+ 3.5 60-67 sufficient 3.0 0-59 insufficient 2.0 No extra assessment methods are anticipated. In case of unforeseen, unusual circumstances mandatory remote teaching and remote assessment methods might be adopted. eHMS entry. Records collected in the course portfolio i.e. individual records of student results, presence lists, database of oral and written questions, written assessments of the students.
Elements impelling final grade:	During the semester, the student may obtain a maximum of 80 points, and a credit from the practical part of the exercises. The minimum pass criteria include: - 80% attendance - 60% of the maximum points from each colloquium - 60% of the maximum points from the seminar - Obtaining a credit from the laboratory classes In the event of an excused absence on a colloquium, the form of the colloquium does not change.
Teaching base:	Department of Food Hygiene and Public Health Protection; IVM lecture rooms; external stakeholders (food processing plants)

Mandatory and supportive materials :

1. European Commission 2016/C 278/01 Commission Notice on the implementation of food safety management systems covering prerequisite programs (PRPs) and procedures based on the HACCP principles, including the facilitation/flexibility of the implementation in certain food businesses /latest version/

2. FAO: MEAT PROCESSING TECHNOLOGY FOR SMALL- TO MEDIUMSCALE PRODUCERS http://www.fao.org/3/a-ai407e.pdf

3. The legal acts indicated by the teachers during the exercises (EUR – lex, Codex Alimentarius).
4. Hui Y.H.et all Handbook of meat and meat processing, CRC Press 2012
5. Arvanitoyannis I.S. HACCP and ISO 22000 Appilications to Foods of Animal Origin, Wiley-Blackwell 2009
6. Doyle M.P. et all Food Microbiology. Fundamentals and Frontiers ASM Press 2001
7. D'Mello J.P.F. Food Safety. Contaminants and toxins. ©CAB International 2003.
8. Warriss P. D.: MEAT SCIENCE An Introductory Text. © CAB International 2000.
9. Jensen W. K.: Encyclopedia of Meat Sciences. Vol. 1- 4. © 2004 Elsevier Ltd.
10. Bibek Ray & Arun Bhunia: Fundamental food microbiology. Fourth Edition. CRC Press 2007.

Relevant scientific publications, including those of the module coordinator.
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ANNOTATIONS

During classes in the laboratory rooms the student should be dressed in a clean white coat, the outer clothing should be left in the cloakroom.

* 3 – complete and detailed, 2 – moderate, 1 – basic.

Quantitative summary of the module:

Estimated number of work hours per student (contact and self-study) essential to achieve presumed learning outcomes of the module - base for quantifying ECTS:	**100 h**
Total ECTS points, accumulated by students during contact learning:	**3 ECTS**